User’s guide

V1.2

SWB231DP

Parallel Signal Control

Miniature Integrated Stepper Motor Driver

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Miniature Integrated Stepper Motor Driver

Integral design

- Miniature 42.3mm×42.3mm×19mm（L×W×H）
- Integral design with motor, can also work separately
- Be made of die-cast aluminum which provides a rugged, durable protection and improves the heat dissipation.

Features

- Wide range input voltage 12-40V
- 0-4A adjustable output current
- 1 to 128th micro stepping
- Dual full H-bridge with PWM constant current control
- Optical-isolated inputs
- Automatic current reduction
- Up to 300KHz frequency response

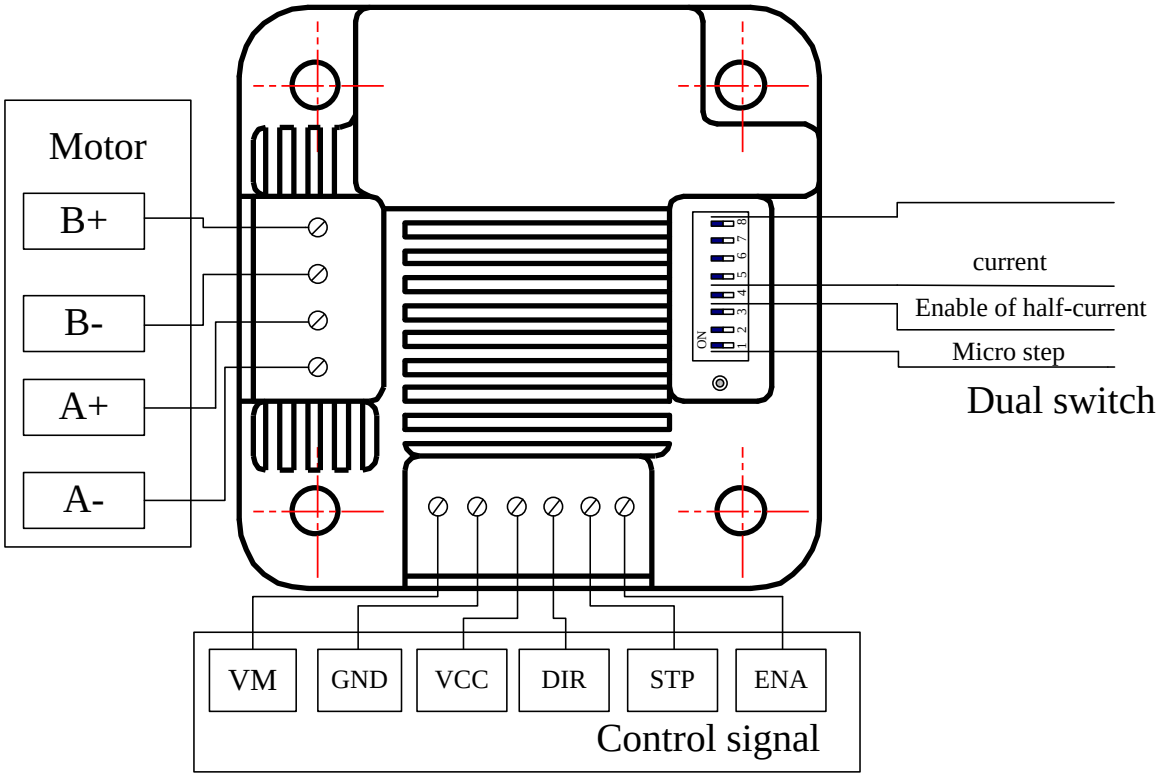
Description

SWB231DP is series miniature, high performance stepper motor controller. It can be mounted onto 42/56/60 series stepper motor seamlessly through corresponding flanges. The thickness of these controller is less than 15mm. SWB231DP outputs 0-2A adjustable current its mixed-decay current reduces the back-EMF effect under high motor speed and improves the performance.

The enclosure is made of die-cast aluminum which provides a rugged, durable protection and improves the heat dissipation.

Terminal description

Fig 1 Wiring terminal



Control terminals

NO.	Designator	Description
1	VM	Supply voltage：12-40VDC.
2	GND	Supply voltage ground.
3	VCC	Opto-coupler common anode.
4	DIR	Direction input. Input is considered high level if this terminal is not connected.
5	STP	Stepping pulse input. Low-level pulse duration should>4us
6	ENA	Enable the controller. High level input or left open makes the controller full working. An low-level input shut down power supply to the motor

Motor terminal

Designator	Description
A+/A-	Connect to the stepper motor phase A
B+/B-	Connect to the stepper motor phase B

Warning: Incorrect connection of phase winds will permanently damage the controller

Resistance between leads of different phases is usually>100KΩ. Resistance between leads of same phases is usually<100Ω.

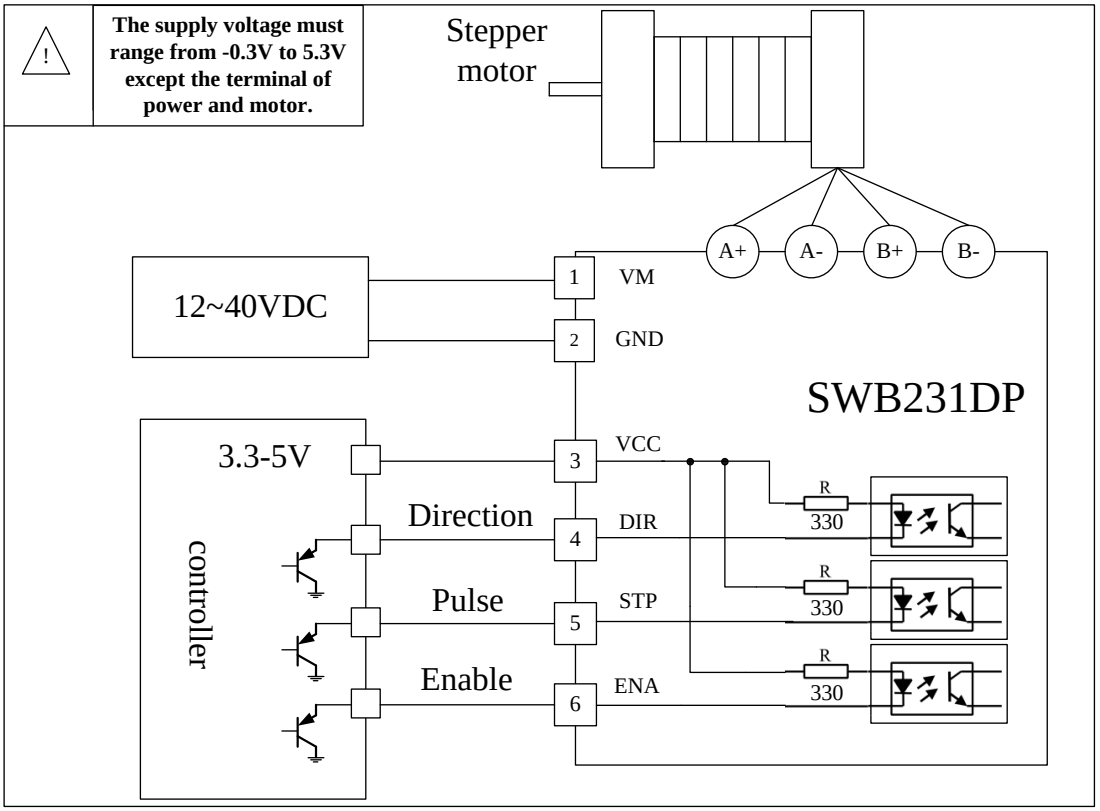
Warning: The supply voltage must range from -0.3V to 5.3V except the terminal of power and motor.

Dual switch

<table>
<tr><td>NO.</td><td>Description</td><td colspan="5">Detailed setting</td></tr>
<tr><td rowspan="10">1~3</td><td rowspan="10">Micro stepping</td><td></td><td colspan="3">NO.</td><td rowspan="2">Setting</td></tr>
<tr><td></td><td>3</td><td>2</td><td>1</td></tr>
<tr><td></td><td>OFF</td><td>OFF</td><td>OFF</td><td>1</td></tr>
<tr><td></td><td>OFF</td><td>OFF</td><td>ON</td><td>1/2</td></tr>
<tr><td></td><td>OFF</td><td>ON</td><td>OFF</td><td>1/4</td></tr>
<tr><td></td><td>OFF</td><td>ON</td><td>ON</td><td>1/8</td></tr>
<tr><td></td><td>ON</td><td>OFF</td><td>OFF</td><td>1/16</td></tr>
<tr><td></td><td>ON</td><td>OFF</td><td>ON</td><td>1/32</td></tr>
<tr><td></td><td>ON</td><td>ON</td><td>OFF</td><td>1/64</td></tr>
<tr><td></td><td>ON</td><td>ON</td><td>ON</td><td>1/128</td></tr>
<tr><td>4</td><td>Enable of half-current</td><td colspan="5">The standby-current will be half the full-current after 300ms that no pulse is coming if this bit is ON.</td></tr>
<tr><td rowspan="18">5~8</td><td rowspan="18">Current</td><td colspan="4">NO.</td><td rowspan="2">Current（A）</td></tr>
<tr><td>8</td><td>7</td><td>6</td><td>5</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>0.25</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>0.5</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>0.75</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>1</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>1.25</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>1.5</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>1.75</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>2</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>2.25</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>2.5</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>2.75</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>3</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>3.25</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>3.5</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>3.75</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>4</td></tr>
</table>

Typical terminal

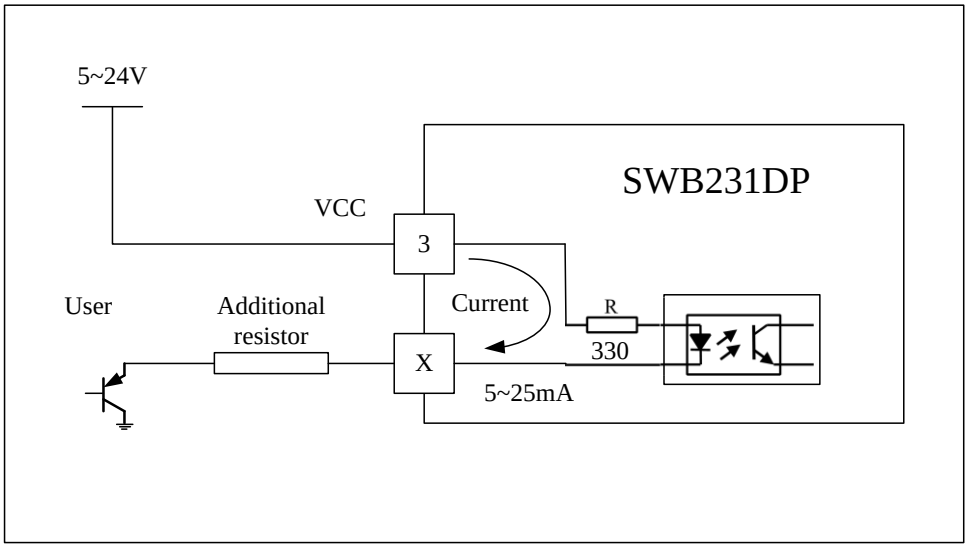
Fig. 2 Typical application of SWB231DP



Optically isolated input interface

SWB231DP controllers, logic control inputs are all optically isolated. All opto-isolators share one common anode(VCC) as shown in below schematic diagram. Typically, VCC is 5V. However, 3.3V or voltages higher than 5V are also acceptable, so long as the current through the opto-isolator,s emitter is between 7~25mA. Should a voltage higher than 5V be applied to VCC, an additional resistor is needed for every terminal to ensure that the current through each emitter does not exceed 25mA. Table 1 shows the reference value of additional resistor.

Fig. 3 Optically isolated common anode input interface



Note： X=4,5,6，in this figure means terminal DIR，STP，ENA respectively.

Table 1 Reference value of additional resistor

VCC（V）	Additional resistor value（Ω）
3.3	0
5	0
9	1000
12	1500
15	2100
24	3600
30	4700
36	5800

Characteristics

Supply voltage	12V~40V
Ambient temperature under bias	-40° ~85° C
Storage temperature	-55° C~150° C

NOTICE: stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operations of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Electrical characteristics(Ambient Temperature 25° C)

Supply power voltage	12V~40VDC			
Motor output current	Max 2A per phase（Adjustable through on0board trimmier）			
Driving mode	PWM constant current			
Stepping resolution	Full, 1/2step, 1/4 step, 1/8 step, 1/16 step, 1/32 step, 1/64step, 1/128step			
Maximum input frequency of pulse	MIN.	TYP.	MAX.	CONDITION
	5K	6K	12K	Full step
	100K	200K	300K	1/32 step
Insulation resistance	＞100MΩ			
Dielectric strength	0.5KV in one minute			

Communication(Ambient Temperature 25° C)

Parallel communication	3-wire interface: Pulse, Direction, Enable
Micro step resolution	Set through on board dual switch 1-3

Environment requirements

Cooling	Free air
Working environment	Avoid dust, oil mist and corrosive gases
Working temperature	-40° C~85° C
Humidity	＜80%RH，no condensation, no frosting
Vibration	3G Max
Storage temperature	-50° C~150° C

Size and weight

Size	42.3mm×42.3mm×20mm(L*W*H)
Weight	0.2Kg

Appendix 1：Dimensions